POLYCYCLIC AROMATIC COMPOUNDS (PACs) AND BENZO(G,H,I)PERYLENE

PACs AND BENZO(G,H,I)PERYLENE

- PBT activity threshold
  - PAC category threshold: 100 pounds
  - Benzo(g,h,i)perylene threshold: 10 pounds
- 3-Methylcholanthrene and Benzo(j,k)fluorene (fluoranthene) were added as members of the PAC category
- All members (new and old) of the expanded PAC category are PBT chemicals
- Benzo(g,h,i)perylene is an individually listed polycyclic aromatic hydrocarbon (PAH) that is a PBT chemical
  - Not a member of PAC category

POLYCYCLIC AROMATIC COMPOUNDS

Benzo(a)anthracene
Benzo(b)fluoranthene
Benzo(j)fluoranthene
Benzo(k)fluoranthene
Benzo(j,k)fluorene (fluoranthene)*
Benzo(r,s,t)pentaphene
Benzo(a)phenanthrene (chrysene)
Benzo(a)pyrene
Dibenz(a,h)acridine
Dibenz(a,j)acridine
Dibenzo(a,h)anthracene
7H-Dibenzo(c,g)carbazole
Dibenzo(a,e)fluoranthene
Dibenzo(a,e)pyrene
Dibenzo(a,h)pyrene
Dibenzo(a,l)pyrene
7,12-Dimethylbenz(a)anthracene
Indeno(1,2,3-cd)pyrene
3-Methylcholanthrene*
5-Methylchrysene
1-Nitropyrene

* Newly listed (October 29, 1999; 64 FR 58666)

SOURCES OF POLYCYCLIC AROMATIC COMPOUNDS

- Coal
- Fuel oil and other petroleum products
- Asphalt
- Creosote wood treatment

POLYCYCLIC AROMATIC COMPOUNDS

- PACs are found in coal, fuel oil and other petroleum products
- Default concentrations (weight-based)
  - 10 ppm in No. 2 fuel oil (Ref. 5)
  - 2,461 ppm in No. 6 fuel oil (Ref. 2)
  - Also present in other fossil fuels, petroleum products, coal tars, etc.
- Considered otherwise used if combusted on-site
- Considered processed if distributed in fuels, petroleum products, and other products

POLYCYCLIC AROMATIC COMPOUNDS

- PACs are also coincidentally manufactured during the combustion of fossil fuel
- Default air emission factors:
  - 1.12 pounds per million tons of coal combusted in a boiler with air pollution controls (Ref. 3)
  - 3.15×10^{-5} pounds per million standard cubic feet natural gas burned in a utility boiler (Refs. 3, 4)
  - 0.0165 pounds per million gallons of No. 6 fuel oil burned in a utility boiler (Ref. 3)

POLYCYCLIC AROMATIC COMPOUNDS

- Additional factors for coal and oil combustion available in *Locating And Estimating Air Emissions From Sources Of Polycyclic Organic Matter* (Ref. 4)
  - Includes several factors available for different types of coal, types of boilers, and different types of air pollution control
  - Contains emission factors for several members of the PAC category, benzo(g,h,i)perylene, and other chemicals

BENZO(G,H,I)PERYLENE

- Benzo(g,h,i)perylene is a separately listed polycyclic aromatic hydrocarbon
  - Similar to PACs and found in same materials
  - Benzo(g,h,i)perylene is not a member of the PAC category
- Default concentrations
  - 0.05 ppm in No. 2 fuel oil (Ref. 5)
  - 26.5 ppm in No. 6 fuel oil (Ref. 2)
  - Present in other fossil fuels, petroleum products, coal tars, etc.

BENZO(G,H,I)PERYLENE

- Benzo(g,h,i)perylene is coincidentally manufactured during the combustion of fossil fuel
- Default air emission factors:
  - 0.027 pounds per million tons coal combusted in a boiler with air pollution controls (Ref. 3)
  - 0.00226 pounds per million gallons of No. 6 fuel oil burned in a boiler (Ref. 3)

PACs AND BENZO(G,H,I)PERYLENE EXERCISE

- A facility transitioned from combusting No. 6 fuel oil to combusting No. 2 fuel oil during the reporting year. The facility combusted 3,000 gallons of No. 6 fuel oil and 1,000,000 gallons of No. 2 fuel oil in an utility boiler.
- Has an activity threshold been exceeded?
  - Assume No. 6 fuel oil has a density of 8.0 pounds per gallon and No. 2 fuel oil has a density of 7.0 pounds per gallon.

PACs AND BENZO(G,H,I)PERYLENE

- For more information:

1. *Guidance for Reporting Toxic Chemicals: Polycyclic Aromatic Compounds Category*. U.S. EPA, Office of Information Analysis and Access. August 2001. Available at http://www.epa.gov/tri
2. *Using Systematic and Comparative Analytical Data to Identify the Source of an Unknown Oil on Contaminated Birds*. Wang, Z. et al. *Journal of Chromatography A*. Volume 775, pp. 251-265. 1997.
3. *Compilation of Air Pollutant Emission Factors (AP-42),* Volume 1, Fifth Edition, Chapters 1.1, 1.3, & 1.4. U.S. EPA, Office of Air Quality Planning and Standards. 1998. Available at http://www.epa.gov/ttn/chief/ap42/index.html
4. *Locating And Estimating Air Emissions From Sources Of Polycyclic Organic Matter*. U.S. EPA, Office of Air Quality Planning and Standards. 1998. Available at http://www.epa.gov/ttn/chief/le/index.html
5. *Transport and Fate of non-BTEX Petroleum Chemicals in Soil and Groundwater*. American Petroleum Institute, API Publication Number 4593. 1994. Available at http://global.ihs.com/